NANO Beam position monitor an feedback controller

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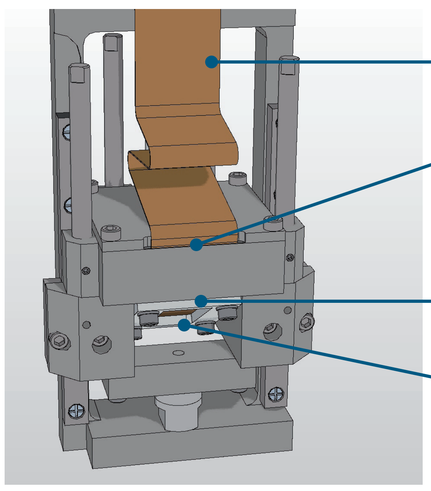
FMB Oxford

FMB Oxford NANO BPM
In-vacuum detector head, image processing unit (B100) and control computer (rack mount or desk top)
FMB Oxford exclusively licences this technology from the University of Manchester

MANCHESTER 1824



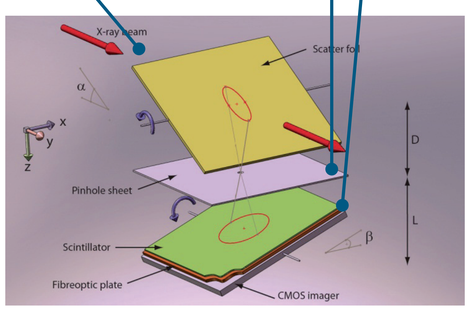
In-vacuum signal cable

CMOS imager

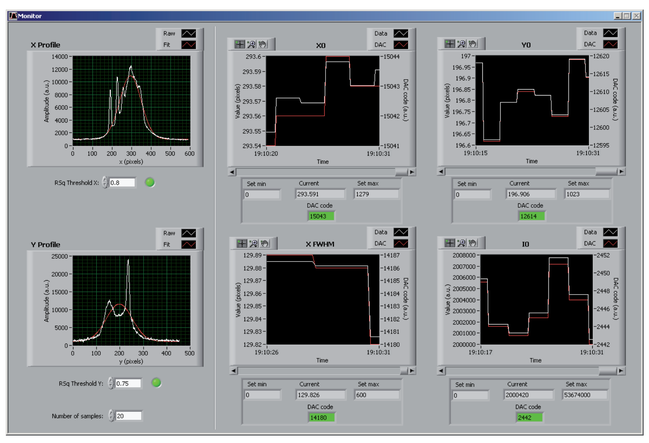
Tungsten pin-hole

Scattering foil

The NANO BPM operates by scattering a small fraction of the beam from a low z foil (KAPTON, Mica or Diamond) which is then analysed by an in-vacuum pinhole camera

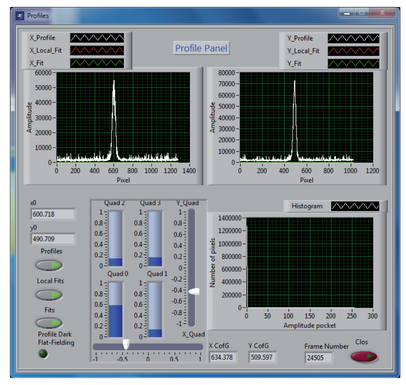


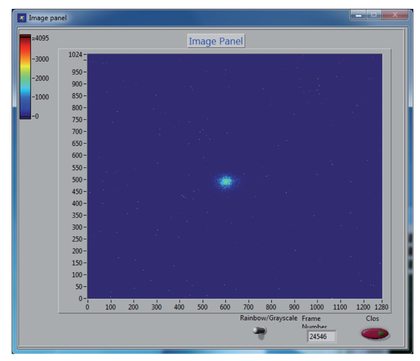
The NANO BPM comes with a full suite of control routines. The system operates on a Windows 7 server. A LabView executable interfaces to the B100 and serves EPICS process variables.
FMB Oxford also supply a full EPICS database and EDM GUI set for integration.



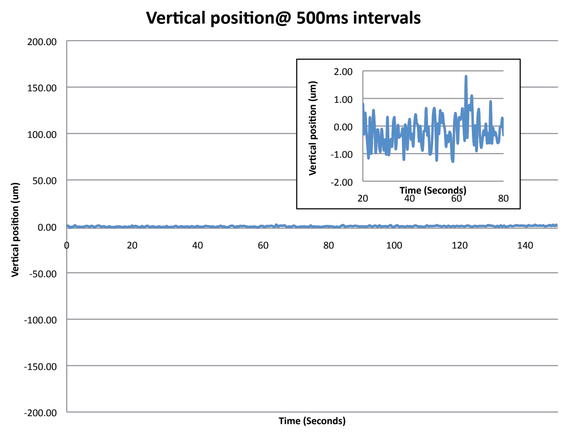
The NANO BPM comes with four independent 0-10V feedback outputs. Each output can be driven by x or y peak position, centroid position, I0 or FWHM.

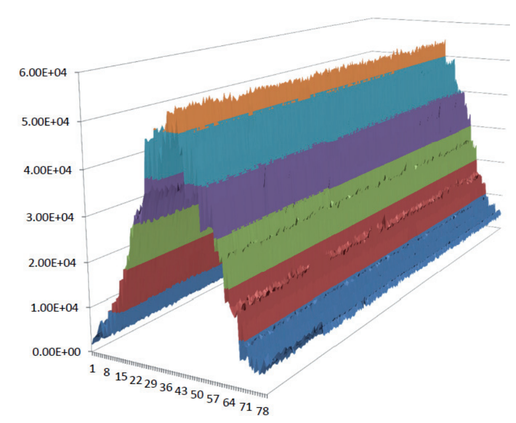
The NANO BPM can be driven in and out of the beam with a linear drive, the in-position repeatability is achieved with a ball and cone





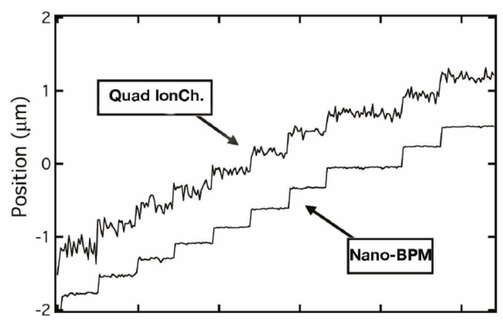
NANO BPM image and profiles of the I22 beam at Diamond Light Source

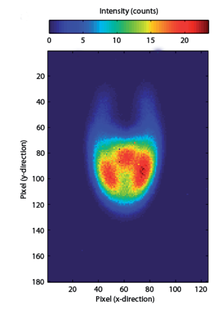




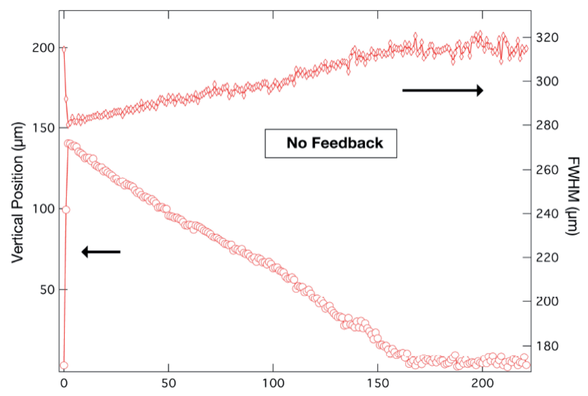
Analysis of the I22 beam in the vertical

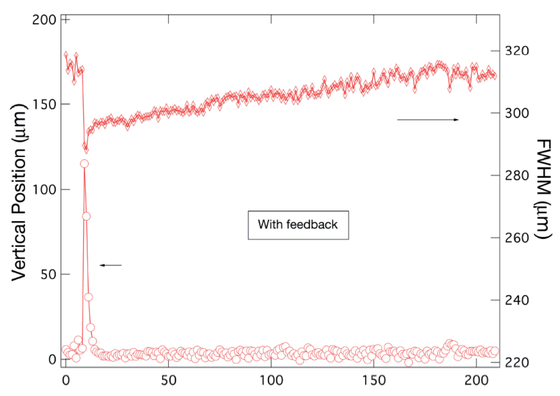
Panel 1 is the vertical position of the peak in microns, the beam size is approximately 300µm the RMS drift is approximately 0.5µm up with a peak to peak maximum of 1.5µm. Panel 2 is the 3D reconstruction of the beam profile over time





Comparison of the resolution of the NANO BPM with the performance of a quadrant ion chamber at ESRF





Feedback control of a double crystal monochromator.

Left panel a 1keV scan without feedback and Right with feedback. The first points are the monochromator moving to the start position of the scan.

Specifications

Operating principal	Low Z scatterer, pinhole focussed CMOS imager
External accuracy	< 100nm (200µm beam, 10^{12} photons/sec)
Integration time	0.02 – 5 seconds
Digitization	16 bit
Power input	12V DC

Outputs

Number	Four
Signal Type	Analogue voltage 0-10V
Mapping	Independently mappable

Ordering Information

FMB Oxford NANO beam position system	AHD2402

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